

AMENDMENTS TO THE SPECIFICATION

Please amend the Specification pursuant to 37 C.F.R. § 1.121 as follows:

Please amend the paragraph beginning on page 1, line 6, as follows:

The invention relates to an inkjet cartridge for dispensing a predetermined amount of fluids; in particular, the invention relates to an inkjet cartridge with capillary tubes arranged in a high-density array.

Please amend the paragraph beginning on page 1, line 12, as follows:

Advances in industries employing chemical and biological processes have created a need for devices that accurately and automatically dispense small quantities of liquids containing chemically or biologically active substances for commercial or experimental use. Accuracy and precision in the amount of liquid dispensed ~~is~~ are important both from the standpoint of causing a desired reaction and minimizing the amount of material used. An example of a device with an array of reagents disposed thereupon is a biochip.

Please amend the paragraph beginning on page 1, line 21, as follows:

In Fig. 1a and Fig. 1b, a conventional apparatus for dispensing reagents disclosed in U.S. Pat. No. 6,001,309 is shown. Fig. 1a is an exploded top perspective view of the conventional dispensing apparatus. Fig. 1b is an enlarged, schematic, top perspective view of a setup of a nozzle delivery assembly of the conventional dispensing apparatus. Referring to Fig. 1a, the conventional dispensing apparatus 20 comprises a head assembly 21 having a plurality of nozzles (not shown). A base assembly 25 is provided with at least one reaction well 26 and a transport mechanism (not

shown). An array of wells 26 is provided and formed in a microtiter plate 32. Referring to Fig. 1b, a delivery assembly 43 controls delivery of reagents 24 through nozzles to reservoirs 23. ~~In The the~~ delivery assembly 43, ~~couples~~ the nozzles are coupled to reservoirs 23 ~~through~~ by dispensing tubes 44.

Please amend the paragraph beginning on page 2, line 8, as follows:

Recently, inkjet printers have become established as reliable and efficient dispensing devices. However, there are two main concerns when applying the inkjet cartridges in the biological and chemical analysis. One is that the reagents in the inkjet cartridge must be stored in a manner that provides a slight back pressure at to the inkjet cartridge to prevent leakage from the inkjet cartridge when the inkjet cartridge is inactive. The other one is that the inkjet cartridge must avoid any intermixing of the different kinds of reagents.

Please amend the paragraph beginning on page 2, line 17, as follows:

Fig. 2 shows a conventional inkjet cartridge that can adjust its back pressure and is disclosed in U.S. Pat. No. 5,505,339. An accumulator 50 is configured to fit into an inkjet cartridge 52 ~~that~~ ~~includes~~ including a reservoir 54 that hold a quantity of ink. The accumulator 50 includes an expandable bag 62 that is mounted to a spring 64. With such structure, the inkjet cartridge can adjust its back pressure based on environmental changes. Other conventional inkjet cartridges that can adjust its back pressure are disclosed, ~~for example,~~ in U.S. Pat. No. 5,526,030, U.S. Pat. No. 4,771,295, U.S. Pat. No. 5,047,790, U.S. Pat. No. 5,409,134, and U.S. Pat. No. 5,998,803.

Please amend the paragraph beginning on page 3, line 3, as follows:


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Fig. 3a and Fig. 3b shows a conventional inkjet cartridge that can avoid intermixing of the different kinds of inks, ~~and~~ which is disclosed in U.S. Pat. No. 5,497,178. Fig. 3a is a perspective, sectional view of a print head body of the conventional inkjet cartridge as disclosed in U.S. Pat. No. 5,497,178, and Fig. 3b is a bottom view of the printer head body in Fig. 3a. A conventional inkjet cartridge 60 includes a print head body 61 containing three standpipe portions 62, 63, and 64. The standpipes 62, 63 and 64 are located in separate ink chambers 66, 67, 68, respectively. Exit ports 71, 72 and 73, as shown in Fig. 3b, communicate with the ink chambers 66, 67, 68, respectively. An opening 77 in the bottom of the standpipe 62 ~~permits~~ allows ink to flow downwardly into a crossflow channel 81. An opening 78 in the bottom of the standpipe 64 ~~permits~~ allows ink to flow downwardly into a crossflow channel 82. The ~~eross~~ crossflow channel 81 slopes downwardly and forwardly, terminating in a reduced cross-section portion 83 which in turn leads to the exit port 71. Similarly, the ~~eross~~ crossflow channel 82 slopes downwardly and forwardly, terminating in a reduced cross-section portion 84 which in turn leads to the exit port 73. With such structure, the inkjet cartridge can avoid intermixing of the different kinds of inks. Other conventional inkjet cartridges that can avoid intermixing of the different kinds of inks are disclosed, for example, in U.S. Pat. No. 5,659,345 and U.S. Pat. No. 5,831,653.

Please amend the paragraph beginning on page 3, line 28, as follows:

However, all of the conventional inkjet cartridges that can avoid intermixing of the different kinds of inks are very complicated in structure. In addition, it is difficult to apply conventional inkjet cartridges ~~to apply to~~ used in a dispensing device in which the amount of the dispensing fluid is very small.

Please amend the paragraph beginning on page 4, line 13, as follows:

Accordingly, the invention provides an inkjet cartridge for dispensing a predetermined amount of reagents. The inkjet cartridge comprises an inkjet print head and an array of capillary tubes. The print head is provided with a plurality of fluid channels. The capillary tubes, filled with predetermined reagents, are disposed on the inkjet print head so as to communicate with the fluid channels respectively and provide capillarity sufficient to prevent the reagents in the capillary tubes from leaking through the fluid channels, but not so great as to prevent the reagents in the capillary tubes from dispensing through the fluid channels.

Please amend the paragraph beginning on page 4, line 24, as follows:

In a preferred embodiment, the inkjet print head comprises a base, an inkjet chip and a nozzle plate. The base, having a plurality of first through holes corresponding to the capillary tubes respectively, receives the capillary tubes. The inkjet chip, for actuating the reagents in the capillary tubes to dispense, is disposed on the base and provided with a plurality of second through holes corresponding to the first through holes respectively. The nozzle plate, for dispensing the reagents in the capillary tubes, is disposed on the inkjet chip and provided with a plurality of orifices corresponding to the second through holes respectively. The first through holes, the second through holes and the orifices form the fluid channels respectively.

Please amend the paragraph beginning on page 5, line 8, as follows:

In a preferred embodiment, ~~each~~ parts of the capillary tubes ~~is~~ are filled with gel-like materials or oil-like materials above the received reagent so as to prevent the reagent from leaking.

Please amend the paragraph beginning on page 6, line 17, as follows:

The print head 1 is provided with a plurality of fluid channels 150, as shown in Fig. 5, ~~and comprises~~ includes a base 110, an inkjet chip 120 and a nozzle plate 130. The base 110 is provided with a plurality of first through holes 111 corresponding to the capillary tubes 140 and receiving the capillary tubes 140 respectively. The inkjet chip 120, for actuating fluids 160 in the capillary tubes 140 to dispense, is disposed on the base 110 and provided with a plurality of second through holes 121 corresponding to the first through holes 111 respectively. The nozzle plate 130, for dispensing the fluids 160 in the capillary tubes 140, is disposed on the inkjet chip 120 and provided with a plurality of orifices 131 corresponding to the second through holes 121 respectively. Furthermore, the first through holes 111, the second through holes 121 and the orifices 131 form the fluid channels 150 respectively, as shown in Fig. 5.

Please amend the paragraph beginning on page 7, line 4, as follows:

As shown in Fig. 4c, each of the capillary tubes 140 is filled with predetermined fluid 160. Referring to Fig. 5, each of the capillary tubes 140 is disposed on the base 110 of the inkjet print head 1 so as to communicate with the fluid channels 150 respectively. It is noted that each of the capillary tubes 140 provides capillarity sufficient to prevent the fluids 160 in the capillary ~~tube~~ tubes 140 from leaking through the channel 150 but not so great as to prevent the fluids 160 in the capillary ~~tube~~ tubes 140 from dispensing through the channel 150. That is, the back pressure of the fluid 160 in the capillary ~~tube~~ tubes 140 can be controlled by the capillarity of the capillary ~~tube~~ tubes 140.

Please amend the paragraph beginning on page 7, line 15, as follows:

In addition, for enlarging the capacity of the fluid 160 in the capillary ~~tube~~ tubes 140 without leakage, a cap 180 with a pressure regulator 181 is disposed on the top of the capillary tubes 140. By means of the pressure regulator 181, the back pressure in the capillary ~~tube~~ tubes 140 can be properly controlled so that the capacity of the fluid 160 in the capillary tube 140 can be enlarged without causing leakage.

Please amend the paragraph beginning on page 7, line 22, as follows:

It is understood that the fluid 160 can be a reagent during a biological or chemical analysis. After the fluid 160 received in the predetermined capillary ~~tube~~ tubes 140 runs out, the same kind of fluid 160 can ~~be refill~~ refilled into the capillary ~~tube~~ tubes 140, or the whole capillary ~~tube~~ tubes 140 can be replaced with a new capillary ~~tube~~ tubes 140 having ~~with~~ the same kind of fluid 160.